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(54) **VENTURI FOR USE IN SWIRL CUP PACKAGE OF GAS TURBINE COMBUSTOR HAVING WATER INJECTED THEREIN**

reduces axial stresses imposed on the venturi 34 when water impinges on an upstream portion of the venturi 34.

(57) Abstract:

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PROBLEM TO BE SOLVED: To obtain a venturi improved to be protected against axial stresses imposed on the venturi, which stresses are caused by a temperature gradient generated by water injection into a combustor.

SOLUTION: A combustion apparatus for a gas-turbine engine includes a combustor structure having at least one combustion chamber 14, a dual cone fuel nozzle 24 for injecting both fuel and water to the combustion chamber 14 and a swirl cup package upstream of and adjacent to this combustion chamber 14. The swirl cup package 22 further includes a swirler 28 and a venturi 34 extending in the axial direction between the fuel nozzle 24 and the combustion chamber 14 for mixing the fuel and water with air. The venturi 34 is configured to have a thickness (t) from an upstream end 44 to a downstream end 46, which thickness provides a heat transfer conduction path that

